

INTRODUCTION

MATERIALS SECTION ORGANIZATION

Materials Section, headed by an Assistant State Engineer, is made up of three services; Materials Testing Services, Pavement Services and Geotechnical Services.

MATERIALS TESTING SERVICES

This service is under the direction of the Testing Engineer. It is commonly referred to as the "Central Laboratory", and its primary functions include, but are not limited to, the testing of preliminary engineering samples and construction materials, mix designs, and the standardization of equipment and testing procedures. Testing Services is divided into the Materials Testing Branch and the Quality Assurance Branch.

A. Materials Testing Branch

1. Preliminary Engineering Samples

Samples of materials to be tested are delivered to the central laboratory from the field with the proper description of the material, the source, and instructions for testing.

The material may be from existing highways, for proposed highways, or from proposed material sources. The laboratory performs the required tests and determines the required mix designs. The data is tabulated and a copy of the results are submitted to Pavement Services for analysis and use in pavement design and materials source designation.

Some of the principle tests made are:

- a. Sieve Analysis
- b. Abrasion
- c. Sand Equivalent
- d. Moisture-Density
- e. "R" Value
- f. Plasticity Index
- g. pH and Resistivity
- h. Specific Gravity and Absorption
- i. Bituminous Mix Designs

A more detailed outline of the function and test procedures used may be found in the "Materials Testing Manual."

2. Construction Samples

A list of samples required by the contract specifications is prepared by the central laboratory. Many of the materials are tested in the Project, Area or District Laboratories and the testing of these materials in the Central laboratory is primarily for correlation purposes. Products for which the project, area or district laboratories are not equipped to test are all tested in the Central laboratory. When these samples are submitted to the laboratory the required tests are made and the results tabulated and forwarded to the project and other proper agencies. The purpose of the tests is for acceptance of materials incorporated into the project.

3. Final Record Samples

Final record samples, taken and submitted by the Geotechnical Services core drill unit, are tested as required and reports submitted.

B. Quality Assurance Branch

The principle functions of the Branch are:

1. Visiting the department laboratories and examining the equipment to determine if it conforms with the specifications and reporting the findings.

2. Examining the test procedures used in the department laboratories by review with the supervisor or visual observation of actual tests being performed and reporting any deviation from requirements.

3. Refurbishing, standardizing and calibrating equipment sent in from materials laboratories statewide.

4. Maintaining the Quality Assurance Program and Independent Assurance Sampling Testing Program.

PAVEMENT SERVICES

This service is under the direction of the Pavement Engineer. The service is divided into the Pavement Design Branch and the Pavement Management Branch. Pavement Design is

responsible for determining the thickness and quality of material of all layers of the pavement structure. Design thicknesses are determined from the analysis of traffic loading, soil strength, climate and other project specific information. The quality of each layer in terms of its support capability (strength, stability, and durability) is also used to determine the layer thickness. Typical projects considered by Pavement Design include new construction, reconstruction, rehabilitation, overlaying and/or seal coating. Within each project a structural pavement section or sections is determined after analyzing a variety of possible layer materials such as asphaltic concrete, concrete, aggregate base, cement treated base and/or recycling to name a few. In addition, a large number of possible thicknesses of each is also considered. The final design section is incorporated in the plans. All important information pertinent to the pavement design is stated in the "Special Provisions" of the contract specifications.

Pavement Management annually inventories each mile of the 6,000 mile State Highway System for ride roughness and cracking. In addition skid resistance tests are taken as requested and as time permits for inventory. Reports detailing the results of these tests are made available to Pavement Design in order to improve overlay and rehabilitation designs. In addition, the inventory data is used to help derive management standards for highway performance. Given these standards, inventory data and other pertinent data, a Five-Year-Preservation Program is developed. After consultations with each District, this program is taken through the priority planning process by Materials Section, and ultimately becomes the Department's Five-Year-Preservation program. Generally, each preservation project is tested for deflection by Pavement Management. Results of these tests are used by Pavement Design to help determine overlay thickness. Pavement condition data is also collected, as time permits, on the State Airport System.

Due to the type of data collected by Pavement Management considerable use of the data is made by other departmental areas, including Transportation Planning, Maintenance, Development and each District. Occasionally, outside needs require testing for City or County Agencies as well as the Department of Public Safety and Attorney General's Office.

GEOTECHNICAL SERVICES

This service is under the direction of the Geotechnical Engineer. The service is responsible for functions relating to soils and geotechnical engineering (with the exception of

research) required for the planning, design, construction and maintenance of roads and bridges under ADOT's jurisdiction. The principle functions include but are not limited to preliminary subsurface investigation of proposed roadways, existing roadways materials sources, structure foundation design, building foundation design, water wells, waste water disposal (leach fields), existing highway problems and problems encountered during construction projects (slope stability, landslides, etc.). The service is also responsible for determining slope ratios and excavation factors.

The investigations may include the following:

- a) drilling or excavations
- b) sampling
- c) instrumentation
- d) laboratory testing
- e) engineering analysis
- f) preparation of reports documenting the investigation, analysis and recommendations.

The service is separated into two branches: The Materials Investigation Branch and the Foundation and Geologic Investigation Branch.

1. Materials Investigation Branch

This branch is supervised by the Senior Materials Investigation Engineer and consists of backhoe crews, core drill crews and the pit development group (a location crew and several office employees.) The backhoe crews perform investigations of proposed roadways, existing roadways and materials sources. The core drill crew performs investigations on existing roadways proposed for rehabilitation projects and obtains final record samples, which are taken to measure thicknesses of various pavement components after they have been placed on the roadway. Final Record samples and measurements are taken at approximate one-mile intervals on each roadway and frontage road, and one on each ramp and crossroad. Records are prepared and reports made to the Federal Highway Administration on all Federal Aid projects.

The Pit Development Group performs a number of functions including:

- a) Assist in obtaining licenses on new pits and renewing licenses on existing sources.

- b) Locate new sources and recommend extensions of existing sources.
- c) Maintain pit files and assist persons desiring to review them.
- d) Perform all drafting for Materials Section.
- e) Provide Pavement Design Memorandum attachments.
- f) Develop preliminary archaeological and environmental information on sites.
- g) Assist in processing and filing test results and other information.
- h) Assist in providing field crews with various information required for investigations.

2. Foundation and Geologic Investigation Branch

This branch is supervised by a Senior Materials Investigation Engineer and consists of two drill crews. The crews are headed by an Engineering Geologist. The crews perform subsurface investigations including but not limited to:

- a) Structure Foundations
- b) Building Foundations
- c) Water Wells
- d) Waste water (leach field) disposal
- e) Proposed roadways
- f) Quarry Sources
- g) Existing highway problems
- h) Problems encountered during construction projects

MATERIALS REFERENCE INFORMATION

Each Materials Service develops considerable information in the form of test results, analysis data, reports, memos, drawings, etc. which are stored in various files. Generally all test results ultimately reside in the computer by project

number, route and milepost, stationing or pit number. The following special files containing reports and memos are described in greater detail.

MATERIALS PAVEMENT DESIGN FILES

The Materials Pavement Design file is compiled in Materials Pavement Services. This file includes the project number, both Preliminary Engineering and Construction, the project name and termini, and is filed in numerical order according to the preliminary engineering number, regardless of the letter prefix.

The file contains all correspondence, a copy of consultant contract if any, all preliminary engineering data such as subgrade sampling, copies of materials pit logs and test results, all Design Memos and any other data pertinent to the materials pavement design.

GEOTECHNICAL REPORT FILES

These files are prepared and maintained by Geotechnical Services. Generally, all investigations are formalized in report form. The report documents the procedures and method of the investigation, all test results, calculations and includes a summary and recommendations, if appropriate.

The files are maintained in numerical order, with a cross reference to project or pit number. Copies of the reports are also placed in the appropriate pavement design or pit file.

MATERIAL PIT FILES

Once investigation has begun on a materials pit, a pit serial number is assigned to it by Geotechnical Services and a pit file set up. This file contains the original documents prepared in the field; i.e., pit sketch, logs, check sheet, and any field notes that may have been made. It also contains the tabulations of the test results, the aerial photograph, the final pit sketches, the pit license and all correspondence pertaining to the pit and its usage.

CONSTRUCTION FILES

Once a project is advertised for bid, a construction file is compiled by Testing Services by construction project number, and includes a copy of the contract specifications, plans, soil profile, change orders, field and laboratory test results on materials samples, correspondence and any other pertinent data.

GLOSSARY OF TERMS

AGGREGATE

Any hard, inert mineral material used for mixing in graduated fragments. It includes sand, gravel, crushed stone and blast-furnace slag.

a. Coarse aggregate for portland cement concrete - that retained on a No. 8 Sieve.

b. Fine aggregate for portland cement concrete - that passing a 3/8" Sieve and almost entirely passing a No. 4 Sieve, and predominantly retained above the No. 200 Sieve.

ALLIGATOR CRACK

A crack caused by fatigue of the asphaltic concrete surface layer or excessive movement of the underlying layers. Typically alligator cracks form an interconnected network of irregularly shaped polygons varying in size from a few square inches to 1 square foot.

ASPHALT CEMENT

Asphalt that is refined to meet specifications for paving, industrial or special purposes.

ASPHALT CONCRETE (AC)

Asphaltic concrete - A controlled hot mixture of asphalt cement and well-graded aggregate, thoroughly compacted into a uniform dense mass.

ASPHALTIC CONCRETE FRICTION COURSE (ACFC)

A hot mixture of asphalt cement with an open-graded aggregate (20% to 25% air voids) with a maximum size of 3/8 inch used as a surface course.

ASPHALT, EMULSIFIED

A heterogeneous system containing two normally immiscible phases (asphalt cement and water) with a small amount of emulsifying agent. It exists in a liquid state at normal temperatures. Emulsified asphalts may be anionic, with electronegatively charged asphalt globules; or cationic, with electropositively charged asphalt globules, depending upon the emulsifying agent.

ASPHALT EMULSION SLURRY SEAL

A mixture of slow-setting emulsified asphalt, fine aggregate and mineral filler, with water added to produce a slurry consistency.

ASPHALT, LIQUID

Cutback - Asphalt cement which has been liquefied by blending with petroleum solvents. Upon exposure to atmospheric conditions the dilutents evaporate, leaving the asphalt cement to perform its function. These are further classified as Rapid Curing (RC), Medium Curing (MC), or Slow Curing (SC). Presently only MC is specified by the Department.

Medium Curing (MC) - Composed of asphalt cement and a kerosene-type diluent of medium volatility.

ASPHALT PAVEMENT

Pavement which has a surface course of mineral aggregate coated and cemented together with asphalt cement.

ASPHALT RUBBER (AR)

A mixture of asphalt cement and rubber used as a crack sealant, binder, or membrane.

BACKFILL

Material placed to fill an excavated space.

BASE COURSE AND AGGREGATE BASE (AB)

The layer of specified material placed on a subbase course or subgrade to support a surface course.

BITUMINOUS ROAD MIX

A mixture of aggregate and asphalt prepared in place on the roadway.

BITUMINOUS TREATED BASE (BTB)

A mixture of asphalt and aggregate placed as a base course.

BLEEDING (OR FLUSHING)

1. Upward migration of bituminous material resulting in a film of asphalt on the surface.

2. Escape of water from freshly placed concrete commonly observed as an accumulation on a horizontal surface.

BLOCK CRACK

A crack caused by shrinkage of the bound surface material. Typically block cracks form an interconnected network of nearly square shapes varying in size from 1 square foot to several square feet.

BLOWUP

A raising of concrete pavement at the joints caused by compressive stresses.

BORROW PIT (OR SITE)

The location of suitable material excavated from sources outside the roadway prism, used primarily for embankment (fill).

CEMENT TREATED BASE (CTB)

A mixture of well-graded aggregate, cement, and water placed as a base course.

CEMENT TREATED SUBGRADE (CTS)

A mixture of cement and water with the in-place subgrade.

CLAY (CLAY SOIL)

Fine-textured soil or the fine-grained portion (smaller than 200 microns) of a soil that can be made to exhibit plasticity within a range of water contents and that breaks into clods or lumps when dry.

COMPACTION

The densification of a soil, base course or surfacing course by means of mechanical manipulation.

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (CRCP)

Concrete pavement with continuous longitudinal steel reinforcement and no contraction joints. Typically 0.4% by area or more of steel is used.

CORRUGATIONS

Regular transverse undulations upon a pavement surface.

CRACK

A fissure or open seam not necessarily extending through the body of a material.

CRACKING INDEX

A relative measure of the amount of cracking in an AC surface expressed as percent. Currently done in Arizona by comparison with standard photos of roads for which the amount of cracking has been previously determined.

CULVERT

Any structure under the roadway with a clear opening twenty feet or less measured along the center of the roadway.

DENSITY (UNIT WEIGHT)

Weight of a material per unit volume.

DRAINAGE COEFFICIENTS

Factors used to modify layer coefficients in flexible pavements or stresses in rigid pavements as a function of how well the pavement structure can handle the adverse effect of water infiltration.

DRAINAGE LAYER

A pavement course with high air voids and high permeability to facilitate the movement of moisture.

DURABILITY (D) CRACKING

A series of closely-spaced cracks adjacent and roughly parallel to concrete pavement joints. Caused by the freezing and thawing of unsound aggregates that have a high moisture content.

EMBANKMENT OR FILL

1. A raised structure, constructed of soil, rock, or aggregate to required line and grade.

2. The material, such as soil, rock or gravel, used in the construction of an embankment structure is also referred to as embankment or fill.

EQUIVALENT SINGLE AXLE LOADS (ESAL'S)

Summation of equivalent 18,000-pound single axle loads used to combine mixed traffic to design traffic for the design period.

EXCAVATION FACTOR

An estimate in terms of percent, of the change in volume of a material when excavated, placed in an embankment section, and compacted to specification density.

EXPANSION JOINT

A joint located to provide for expansion of a rigid slab.

FAULTING

A difference in elevation of two adjacent concrete slabs at a joint. Primarily caused by the traffic-induced movement of base material particles from under one joint edge to under the adjacent joint edge.

FINISHED SUBGRADE ELEVATION

The prepared surface that supports the pavement structure.

FLEXIBLE PAVEMENT

An asphaltic pavement structure with sufficiently low resistance to bending to maintain contact with and distributes loads to the subgrade and depends upon aggregate interlock, particle friction, and cohesion for stability.

FOG SEAL COAT (OR FLUSH COAT)

The application of bituminous material with a sand blotter to an AC surface.

FROST ACTION

Freezing and thawing of moisture in materials and the resultant effects on these materials and on structures of which they are a part or with which they are in contact.

GEOSYNTHETICS (GEOMATRIX, GEOMEMBRANE AND GEOTEXTILE)

Thin fabrics, membranes and composites placed on soils for reinforcement or to retard the migration of clay into the pavement structure or placed between pavement layers for reinforcement or to retard crack propagation from an underlying layer to the one above it.

GRADATION

Proportion of each grain-size category present in a material sample.

GRADE-IN/GRADE-OUT POINTS

The intersection of the natural ground surface with the finished grade line on a highway.

GRANULAR

Material that does not contain more than 35 percent of soil particles which will pass a No. 200 sieve.

GRAVEL

Rounded or semi-rounded particles of rock that will pass a 3 inch U.S. Standard Sieve and be retained on a No. 10 U.S. Standard sieve.

GRINDING

The removal of the top of a pavement surface to improve ride and skid resistance.

GROOVING

Producing grooves in a concrete pavement surface to improve frictional characteristics.

GROUND COMPACTION

The compensation, in feet, for the reduction of original ground elevation caused by the construction operation.

HEAVE

Upward movement of soil caused by expansion or displacement resulting from phenomena such as moisture absorption, removal of overburden, driving of piles, frost action, etc.

HYDROPHOBIC AGGREGATE

An aggregate having little or no affinity for water compared to bitumen.

HYDROPHYLLIC AGGREGATE

An aggregate having a great affinity for water compared to bitumen.

JOINTED CONCRETE PAVEMENT (JCP)

Concrete pavements that contain no reinforcing steel for crack control. Load transfer devices may be placed at the joints. Slabs are usually 13 feet to 17 feet long.

JOINTED REINFORCED CONCRETE PAVEMENT (JRCP)

Concrete pavement with some reinforcing steel between joints; dowels at transverse joints and longer slabs than JCP.

JOINT SEALANT

A material used as a filler in concrete pavement joints to prevent infiltration of water, soil and other fine particles.

LAYER COEFFICIENT (A_1, A_2, A_3)

The empirical relationship between structural number (SN) and layer thickness which expresses the relative ability of a material to function as a structural component of the pavement.

LEAN CONCRETE BASE (LCB)

A mixture of aggregate, cement, and water used directly under concrete pavement. Has a lower modulus of rupture than the concrete pavement, and a higher compressive strength than cement treated base.

LEVELING COURSE (LC)

A course of variable thickness used to eliminate irregularities in an existing surface.

LIFE CYCLE COST (LCC)

An economic estimate of the cost to provide a serviceable pavement over the expected life of a pavement; usually 20 to 40 years.

LIQUID LIMIT (LL)

1. The moisture content which is the boundary between the liquid and plastic states for the minus No. 40 fraction of a soil.

2. That moisture content at which a soil fraction will close a standard groove for a length of 1/2 inch when subjected to 25 blows in a liquid limit device.

LOAD TRANSFER DEVICE

A mechanical means designed to carry loads across a joint in a rigid slab.

LONGITUDINAL JOINT

A joint normally placed between traffic lanes in rigid pavements to control longitudinal cracking.

MILLING

The removal of a portion of the pavement surfacing with a milling machine.

MINERAL AGGREGATE (MA)

Aggregate to be mixed with asphalt cement to produce an asphaltic concrete.

MODULUS OF RUPTURE (S_c)

The flexural strength at failure of concrete beams.

MODULUS OF SUBGRADE REACTION (k)

Westergaard's modulus of subgrade reaction for use in rigid pavement design (the load in pounds per square inch on a loaded area of the roadbed soil or subbase divided by the deflection in inches of the roadbed soil or subbase, psi/in.).

MOISTURE CONTENT

1. The proportion of moisture in any material, expressed as a percent of the dry weight.

2. Optimum Moisture Content. The percentage of moisture at which the greatest density of a particular soil can be obtained through compaction by a specified method.

OVERBURDEN

Material of inferior quality which overlies material of desired quality and which must be removed to obtain the desired material.

OVERLAY

One or more courses of asphaltic concrete construction placed on an existing pavement.

PASSING LANE

The left lane of a two lane roadway with both lanes going in the same direction.

PAVEMENT PERFORMANCE

The trend of serviceability with load applications.

PAVEMENT STRUCTURE

The combination of subbase, base course, and surface course placed on a subgrade to support the traffic load and distribute it to the subgrade.

PERMEABILITY

That property of a material which permits a liquid to flow through its pores or interstices.

pH

An index of the acidity or alkalinity of a soil in terms of the logarithm of the reciprocal of the hydrogen ion concentration; e.g., a pH indication of less than 7.0 is acidic, whereas a reading of more than 7.0 is alkaline.

PLASTICITY

The property of a soil which allows it to be deformed beyond the point of elastic recovery without cracking or appreciable volume change.

PLASTICITY INDEX (PI)

Numerical difference between the liquid limit and the plastic limit. This is an indication of the clay content of a soil or aggregate.

PLASTIC LIMIT (PL)

1. The water content corresponding to the transition point between the plastic and semi-solid states of consistency of a soil.

2. Water content at which a soil will just begin to crumble when rolled into a thread about 1/8 inch in diameter.

POLISHED AGGREGATE

The aggregate in a pavement surface worn smooth by traffic.

POROSITY

The ratio, expressed in percent, of the volume of void space (pores) of a material to the total volume of its mass.

PORTLAND CEMENT CONCRETE PAVEMENT (PCCP)

A mixture of aggregate, cement and water that forms a very stiff and rigid pavement.

PRESENT SERVICEABILITY INDEX (PSI)

An index number based on roughness (slope variance), cracking, patching and rutting.

PRESENT SERVICEABILITY RATING (PSR)

A road users opinion, expressed as number between 0 to 5, of a roads ride quality. Higher numbers indicate higher serviceability (smoother ride). Often used in lieu of PSI.

PRESTRESSED CONCRETE PAVEMENT (PCP)

Portland cement concrete pavement containing high-tensile strength wire which is used to apply tensile stresses to the pavement slabs or panels.

PRIME COAT

An application of a low viscosity liquid bituminous material to coat and bind particles preparatory to placing a base or surface course. Generally applied to an aggregate material (AB or ASB).

PROFILE (AND PROFILE GRADE)

The trace of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed. May mean either the elevation or the gradient of the trace depending on the context.

PROJECT

The specific section of the highway and all construction to be performed under the contract.

PUMPING

The ejection of foundation soil through joints or cracks, or along edges of rigid slabs, due to vertical movements under traffic.

R-VALUE

A confined compression test for determining strength of subgrade materials. Used to derive the subgrade modulus (M_r) used in the AASHTO equation for pavement design.

RANDOM CRACK

A crack that is not a longitudinal or transverse crack and that has little or no interconnection with other cracks. May be caused by movement of the pavement structure and/or subgrade.

RAVELLING

Progressive disintegration of a pavement surface through the loss of aggregate particles.

RECONSTRUCTION

The improvement of an existing roadway section by substantially removing and replacing the major portion of the base and surfacing materials.

RECYCLING (PAVEMENT)

The re-use of paving materials in a new pavement structure.

REFLECTIVE CRACKING

Cracking in a pavement surface layer caused by the high stresses from movements of a cracked underlying layer.

REHABILITATION

The improvement of an existing roadway surface by improving the existing surface or placement of additional pavement layers.

RELATIVE DENSITY

The density of a subgrade material or pavement component, after compactive efforts, expressed in percentage of the density obtained by specific laboratory tests performed on the same material.

RELIABILITY

The probability that a pavement will perform satisfactorily for the design period.

RESISTIVITY

A measure of a substance's resistance to the flow of electricity through it, expressed in ohm-centimeters. Used on soils to determine coating requirements for new pipe and used to determine the extent of corrosion of existing metal pipes.

RIGID PAVEMENT

Pavement structure consisting of a portland cement concrete slab of relatively high bending resistance.

RIPRAP

Rock used for the protection of embankments, cut slopes, etc., against agents of erosion, primarily water.

ROADBED

The prepared layer under the pavement structure.

ROADWAY

That portion of the right-of-way required for construction, limited by the outside edges of slopes, including ditches, channels and all structures pertaining to the work.

ROCK

Natural solid mineral matter occurring in large masses or fragments.

RUTTING

Formation of longitudinal depressions by the displacement of soils or surfaces under traffic.

SAMPLE

A small portion of a large quantity of material used for testing purposes to estimate the engineering properties of the material.

SAND

Particles of rock that will pass the No. 4 sieve and be retained above the No. 200 sieve.

SATURATED-SURFACE-DRY (SSD)

Term used to describe the condition of an aggregate in which the pores of all the particles are completely filled with water, but their surfaces are free from moisture.

SCALING

A delamination of a thin portion of the top of portland cement concrete.

SEAL COAT (SC)

A thin treatment consisting of bituminous material, usually with cover material aggregate, applied to a surface course. The term includes but is not limited to sand seal, chip seal, slurry seal, and fog seal.

SEASONAL VARIATION FACTOR (SVF)

An index number that ranges from 0.0 to 5.0 to represent the climatic and environmental conditions at a pavement location. The number becomes larger with increasing severity of climate and environment.

SERVICEABILITY

The ability of a pavement to serve the automobile and truck traffic using it.

SETTLEMENT

The reduction in elevation of pavement or structures due to compression of underlying soils.

SHOULDER

The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of base and surface courses.

SHOVING

Displacement of flexible pavement caused by high shear stresses.

SILT

Material passing the No. 200 sieve that is non-plastic or very slightly plastic and that exhibits little or no strength when dry.

SKID RESISTANCE

The frictional force between a locked tire and a pavement, which resists motion.

SOIL

Sediments or other unconsolidated accumulations of solid particles produced by the chemical and physical disintegration of rocks, and which may contain organic matter.

SOIL PROFILE

The vertical section of a soil showing the nature and sequence of the layers.

SOUNDNESS

Resistance to both physical and chemical deterioration.

SPALLING

Peeling away of a surface, particularly portland cement concrete.

SPECIAL PROVISIONS

Additions and revisions to the standard and supplemental specifications covering conditions and requirements peculiar to an individual project.

SPECIFICATIONS

The compilation of provisions and requirements for the performance of prescribed work.

STABILITY

Property of a material which enables it to retain its other essential characteristics throughout the range of conditions expected in service.

STANDARD PLANS

Drawings approved for repetitive use, showing details to be used where appropriate. (C-Standards)

STANDARD SPECIFICATIONS

Specifications approved for general application and repetitive use.

STONE

Crushed or naturally angular particles of rock that will pass a 3 inch sieve and be retained above a No. 10 sieve.

STRESS-ABSORBING MEMBRANE INTERLAYER (SAMI)

A low-stiffness mixture of asphalt cement, rubber, and mineral aggregate placed between layers of pavement to retard the transfer of stresses between the layers.

STRIPPING

Separation of bituminous films from aggregate particles due to presence of moisture.

STRUCTURAL NUMBER (SN)

A number expressing the required structural strength of a pavement structure for a given combination of subgrade modulus, total equivalent 18-kip single-axle loads, terminal serviceability index, and seasonal variation factor. The required SN must be converted to actual thickness of surfacing, base, and subbase by means of appropriate layer coefficients representing the relative strength of the material to be used for each layer.

STRUCTURES

Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains and other features which may be encountered in the work and not otherwise classed herein.

SUBBASE COURSE (ASB)

A layer of specified material of designed thickness placed on a subgrade to support a base course. In rigid pavement, the base course.

SUBGRADE (SG)

The roadbed materials beneath the pavement structure.

SUPPLEMENTAL SPECIFICATIONS

Approved additions and revisions to the Standard Specifications.

SURFACE COURSE

One or more layers of a pavement structure designed to accommodate the traffic load, the top layer of which resists skidding, traffic abrasion, and the disintegrating effects of climate.

SURFACE RECYCLING

Recycling an existing pavement surface by heating, scarifying, remixing, releveling, compacting and rejuvenating with an emulsified recycling agent.

SURFACE TREATMENTS

Fog coats, fog seal coats, and flush coats.

TACK COAT (TC)

An application of bituminous material to a surface to provide bond with a subsequent course.

TEST HOLE

A hole dug for the purpose of taking a sample. Test holes may be dug in the ground of proposed construction sites, in materials pits or in existing highways.

TIE BARS

Reinforcement steel placed in concrete pavements to provide load transfer at longitudinal joints.

TOP SOIL (TS)

Usually the upper 6 inches of native soil and that portion used in dressing and landscaping earth slopes.

TRANSVERSE CRACK

A crack approximately perpendicular to the centerline caused by longitudinal shortening of the bound surface layer; sometimes called temperature cracks as the shortening is often caused by contraction from temperature changes. Typically, transverse cracks extend across the full width of the pavement.

TRAVEL LANE

When used to distinguish between passing lane and travel lane, the travel lane is the right lane of a two lane roadway with both lanes going in the same direction. Usually both the passing lane and travel lane are considered travel lanes with the passing lane considered the left travel lane and the travel lane considered to be the right travel lane.

VOID

Space in a mass not occupied by solid mineral matter; it may be occupied by air, water, or other fluids.

WARPING

Deviation of pavement surface from original profile caused by temperature and moisture differentials.